

## CLAIM AMENDMENTS

- 1                   1. (previously presented) A method of producing a  
2     strained layer on a substrate, the method comprising the steps of:  
3                   providing at least one first epitaxial relaxing layer on  
4     an SOI-substrate,  
5                   producing a defect region in a layer neighboring a  
6     silicon layer of the SOI-substrate to which strain is to be  
7     transferred, and  
8                   relaxing at least one layer neighboring the silicon layer  
9     to strain the silicon layer of the SOI-substrate and to produce the  
10    strained silicon layer.
- 1                   2. (previously presented) The method according to claim  
2     1, further comprising the step of  
3                   forming defects that give rise to relaxation of at least  
4     one neighboring layer of the layer which is to be strained.
- 1                   3. (previously presented) The method according to claim  
2     1, further comprising the step of  
3                   subjecting the layer structure for relaxation to a  
4     thermal treatment and/or oxidation.
- 1                   4. (previously presented) The method according to  
2     claim 1, further comprising the step of

3                    depositing the first layer upon the silicon layer to be  
4                    strained.

1                    5. (previously presented) The method according to claim  
2                    4 wherein the first layer has a different degree of stress than the  
3                    silicon layer to be strained.

4                    6. (previously presented) The method according to claim  
5                    4 wherein the defect region is produced in the first layer.

7 - 9. (canceled)

1                    10. (previously presented) The method according to  
2                    claim 1 wherein two neighboring layers of the layer to be strained  
3                    have other degrees of stress than the layer to be strained.

1                    11. (previously presented) The method according to  
2                    claim 1 wherein a plurality of layers are relaxed.

1                    12. (previously presented) The method according to  
2                    claim 1 wherein a plurality of layers to be strained, have strain  
3                    transferred to them.

1                    13. (previously presented) The method according to  
2                    claim 1, further comprising the step of

3                    depositing on the first layer epitaxially at least one  
4                    second layer with a different lattice structure.

1                    14. (previously presented) The method according to  
2                    claim 13 wherein the defect region is produced in the second layer.

1                    15. (previously presented) The method according to  
2                    claim 1 wherein on the layer to which strain is to be transferred  
3                    at least one graded layer is deposited as the first layer.

1                    16. (previously presented) The method according to  
2                    claim 15 wherein at the region of the layer to be strained, the  
3                    graded layer has a degree of strain that is different from that of  
4                    the layer to be strained.

1                    17. (previously presented) The method according to  
2                    claim 15, further comprising the step of  
3                    producing a defect region in the graded layer.

1                    18. (previously presented) The method according to  
2                    claim 1, further comprising the step of  
3                    depositing an epitaxial layer structure comprising a  
4                    plurality of layers on the substrate.

1                    19. (previously presented) The method according to  
2                    claim 1, further comprising the step of

3                   relaxing the first layer by a thermal treatment.

1                   20. (previously presented) The method according to  
2                   claim 19 wherein the thermal treatment is done at a temperature  
3                   between 550 degrees and 1200 degrees C.

1                   21. (previously presented) The method according to  
2                   claim 19 wherein the thermal treatment is done at a temperature  
3                   between 700 degrees and 980 degrees C.

1                   22. (previously presented) A method according to claim  
2                   19 wherein the thermal treatment is carried out in an inert  
3                   atmosphere.

1                   23. (previously presented) The method according to  
2                   claim 19 wherein the thermal treatment is carried out in a reducing  
3                   or oxidizing or nitriding atmosphere and especially in nitrogen.

1                   24. (previously presented) The method according to  
2                   claim 1 wherein the relaxation is carried out over a limited region  
3                   of a layer.

1                   25. (previously presented) The method according to  
2                   claim 1, further comprising the step of  
3                   applying a mask.

1                   26. (previously presented) The method according to  
2 claim 1 wherein the defect region is produced by ion implantation.

1                   27. (previously presented) The method according to  
2 claim 26 wherein for the implantation, hydrogen ions or helium ions  
3 are used.

1                   28. (previously presented) The method according to  
2 claim 27 wherein the hydrogen ions or helium ions are implanted  
3 with a dose of  $3 \times 10^{15}$  to  $4 \times 10^{16} \text{ cm}^{-2}$ .

1                   29. (previously presented) The method according to  
2 claim 26 wherein the implantation is done with Si ions.

1                   30. (previously presented) The method according to  
2 claim 29 wherein the Si ions are implanted with a dose of about  $0.5$   
3  $\times 10^{14}$  to  $5 \times 10^{14} \text{ cm}^{-2}$ .

1                   31. (previously presented) The method according to  
2 claim 26 wherein for the implantation, carbon ions, nitrogen ions,  
3 fluorine ions, boron ions, phosphorous ions, arsenic ions,  
4 germanium ions, antimony ions, sulfur ions, neon ions, argon ions,  
5 krypton ions and/or xenon ions are used.

1                   32. (previously presented) The method according to  
2 claim 26 wherein at least two implantations are carried out.

1                   33. (previously presented) The method according to  
2 claim 32 wherein a hydrogen implantation is carried out in  
3 combination with a helium implantation.

1                   34. (previously presented) The method according to  
2 claim 32 wherein a boron implantation is carried out in combination  
3 with a hydrogen implantation.

1                   35. (previously presented) The method according to  
2 claim 13, further comprising out the step of  
3 carrying out two implantations to produce two defect  
4 regions in the first layer and in the second layer.

1                   36. (previously presented) The method according to  
2 claim 26 wherein the substrate during the ion implantation is  
3 tilted at an angle greater than 7 degrees,.

1                   37. (previously presented) The method according to  
2 claim 32 wherein between two implantations a thermal treatment is  
3 carried out.

1                   38. (previously presented) The method according to  
2 claim 1 wherein the defect region is produced by a change in the  
3 temperature during the formation of one of the layers.

1                   39. (previously presented) The method according to  
2 claim 1 wherein the defects are produced in a Si-C layer by thermal  
3 treatment.

40 - 41. (canceled)

1                   42. (previously presented) The method according to  
2 claim 1 wherein a silicon surface layer of the SOI substrate is the  
3 layer to be strained and the SiO<sub>2</sub> of the SOI substrate forms the  
4 insulator of the substrate.

1                   43. (previously presented) The method according to  
2 claim 1 wherein an SIMOX or BESOI substrate is selected as a base  
3 structure for the substrate.

1                   44. (previously presented) The method according to  
2 claim 1, further comprising the step of  
3 selecting a silicon on sapphire as a base structure for  
4 the substrate.

1                   45. (currently amended) The method according to claim 1  
2 wherein the [[one]] layer neighboring the silicon layer becomes  
3 viscous at a temperature required for the relaxation.

46 - 47. (canceled)

1                   48. (previously presented) The method according to  
2 claim 1 Si-Ge or Si-Ge-C or Si-C as the material for the first  
3 layer which is deposited on the layer to be strained.

49. (canceled)

1                   50. (previously presented) The method according to  
2 claim 13 wherein silicon as the material for the second layer which  
3 is deposited upon the first layer.

1                   51. (previously presented) The method according to  
2 claim 15, further comprising the step of  
3 selecting Si-Ge as the material for a graded layer.

1                   52. (previously presented) The method according to  
2 claim 51 wherein the germanium concentration in the graded layer  
3 decreases from the interface with the layer to be strained to the  
4 surface of the graded layer.

1                   53. (previously presented) The method according to  
2 claim 15 wherein the germanium concentration in a Si-Ge layer at  
3 the interface with the layer to be strained is 100 percent.

1                   54. (previously presented) The method according to  
2 claim 1 wherein the total layer thickness of the layer structure is  
3 so selected that during growth of the applied layers these do not  
4 produce any noticeable relaxation.

1                   55. (previously presented) The method according to  
2 claim 54 wherein the dislocation density after the growth amounts  
3 to less than  $10^5 \text{ cm}^{-2}$ .

1                   56. (previously presented) The method according to  
2 claim 1 wherein a layer to be strained has a thickness  $d_3$  in the  
3 range of 1 to 50 nanometers.

1                   57. (previously presented) The method according to  
2 claim 1 wherein the silicon layer to be strained has a thickness  $d_3$   
3 in the range of 5 to 30 nanometers.

1                   58. (previously presented) The method according to  
2 claim 57 wherein the first layer has a thickness  $d_4$  close to a  
3 critical layer thickness for pseudomorphic growth.

1                   59. (previously presented) The method according to  
2 claim 58 wherein a layer thickness ratio  $d_4/d_3$  is greater than about  
3 10.

4                   60. (previously presented) The method according to  
5 claim 13 wherein the second layer has a thickness  $d_5 = 50 - 1000$   
6 nanometer.

1                   61. (previously presented) The method according to  
2 claim 13 wherein the second layer has a thickness  $d_5 = 300 - 500$   
3 nanometer.

1                   62. (previously presented) The method according to  
2 claim 1 wherein the layer to be strained is locally strained.

1                   63. (previously presented) The method according to  
2 claim 62 wherein the layer to be strained is locally strained in  
3 regions which are vertical in a plane with the defect region.

1                   64. (previously presented) The method according to  
2 claim 13 wherein the defect region is produced at a spacing of 50  
3 to 500 nanometers from the layer to be relaxed.

1                   65. (previously presented) The method according to  
2 claim 1 wherein the defect region is at a spacing of 50 to 100  
3 nanometers above the first layer on the layer to be strained.

1                   66. (previously presented) The method according to  
2 claim 13, further comprising the step of  
3 removing the first and second layers after producing the  
4 strained layer or after producing a strained region.

1                   67. (previously presented) The method according to  
2 claim 1 wherein wet chemical material-selective etching is used.

3                   68. (previously presented) The method according to  
4 claim 67, further comprising the step of  
5 etching trenches in the depth of the layers.

1                   69. (previously presented) The method according to  
2 claim 68, further comprising the step, after producing the etched  
3 trenches , of  
4 relaxing the first layer or a further layer by a thermal  
5 treatment.

1                   70. (previously presented) The method according to  
2 claim 68, further comprising the step of  
3 filling the trenches with insulating material to produce  
4 shallow trench insulation.

1                   71. (previously presented) The method according to  
2 claim 1, further comprising the step of  
3                   carrying out at least one further thermal treatment for  
4 relaxation of one or more layers.

1                   72. (previously presented) The method according to  
2 claim 1 wherein a strained layer or an unstrained layer are  
3 produced with a surface roughness of less than 1 nanometer.

1                   73. (previously presented) The method according to  
2 claim 72 wherein a surface roughness of the layers is further  
3 reduced by the growth of a thermal oxide thereon.

1                   74. (previously presented) The method according to  
2 claim 1, further comprising the step of  
3                   producing on a strained region of the layer an n- and/or  
4 p- MOSFET.

1                   75. (previously presented) The method according to  
2 claim 1, further comprising the step of  
3                   depositing a further epitaxial layer comprising silicon  
4 or silicon/germanium or an Si-Ge-C layer or a germanium layer.

1                   76. (previously presented) The method according to  
2 claim 1, further comprising the step of  
3                   producing on a strained silicon-germanium region p-  
4 MOSFETs as further epitaxial layers or as nonrelaxed layers  
5 structures.

1                   77. (previously presented) The method according to  
2 claim 1, further comprising the step of  
3                   producing on unstrained region of the layer 3 to be  
4 strained, bipolar transistors.

1                   78. (previously presented) The method according to  
2 claim 77 wherein for producing a bipolar transistor, a silicon-  
3 germanium layer is applied.

1                   79. (previously presented) The method according to  
2 claim 1, wherein the steps of claim 1 are carried out a plurality  
3 of times.

80 - 89. (canceled)

1                   90. (withdrawn) An electronic component comprised of a  
2 layer structure according to one of the preceding claims 80 - 89.

1                   91. (withdrawn; currently amended) A transistor  
2 especially a modulated doped field effect transistor or a metal

3 oxide semiconductor field effect transistor forms the component  
4 according to claim 90.

1 92. (withdrawn) A fully depleted MOSFET as the  
2 component according to claim 90.

1 93. (withdrawn; currently amended) A tunnel diode,  
2 especially a silicon germanium tunnel diode as the component  
3 according to claim 90.

1 94. (withdrawn) A silicon-germanium quantum cascade  
2 laser as the component according to claim 90.

1 95. (withdrawn) A photo detector as the component  
2 according to claim 90.

1 96. (withdrawn) A light emitting diode as the component  
2 according to claim 90.

1 97. (previously presented) A method of producing a  
2 strained layer on a substrate, the method comprising the steps of:  
3 providing only one first relaxing layer on an SOI-  
4 substrate;  
5 producing a defect region in the first layer; and

6                   relaxing the first layer and simultaneously straining a  
7   neighboring thin silicon layer of the SOI-substrate to produce the  
8   strained silicon layer.

1                   98. (previously presented) A method of producing a  
2   strained layer on a substrate, the method comprising the steps of:  
3                   providing a first relaxing layer on an SOI-substrate;  
4                   epitaxially forming a second layer with a different  
5   structure on the first layer;  
6                   producing a defect region in the second layer; and  
7                   relaxing the first layer and simultaneously straining a  
8   thin adjacent layer of the SOI-substrate to produce the strained  
9   silicon layer.